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Falconbridge	Sul 124-14-71	Sulfidmalm A/S		

Tittel
Report on underground sampling programme at the Skutterud Mines, Modum.

Forfatter	Dato	Bedrift
Gunn Kvaal Hygen John B. Gammon	1971	Sulfidmalm A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Modum	Buskerud	Trondheimske	17141	Skien

Fagområde	Dokument type	Forekomster
Geologi Kjemiske analyser	Rapport	Skutterud
Råstofftype	**Emneord**	
Malm/metall	Co Cu Mo	

Sammendrag
KOMPLETT UTGAVE
Rapporten beskriver kanalprøvetaking fra gruva og resultatet av analysene som er utført ved Robertson Research Mineral Technology Ltd i North Wales.
Prøvetakingsprogrammet er utført av Gunn Kvaal Hygen som diplomoppgave ved NTH.

Summary:
This is the report on last year's underground sampling of Skutterud Mines at Modum. The earlier reported high Mo assays seem to have resulted from poor assying procedures in 1951. The returned Cu and Co values are too low to be of economic interest.
No further work is planned.

Dette eksemplaret inneholder 2 + 8 kartbilag.

A/S SULFIDMALM

INTER-OFFICE MEMORANDUM

Date: January 24th, 1972

To: Falconbridge Nikkelverk A/S

cc: A.M. Clarke
Bergmester Myhra
D.R. Lochhead

From: J.B. Gammon

Subject:

905 - 14, Skutterud, Modum

Please find attached our report on last year's underground sampling of the Skutterud Mines at Modum. The earlier reported high Mo assays seem to have resulted from poor assaying procedures in 1951. The returned Cu and Co values are too low to be of economic interest. No further work is planned.

John B Gammon

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FORSKN./UTV.
EL. LYSEAVD.
SAKSBEARB.

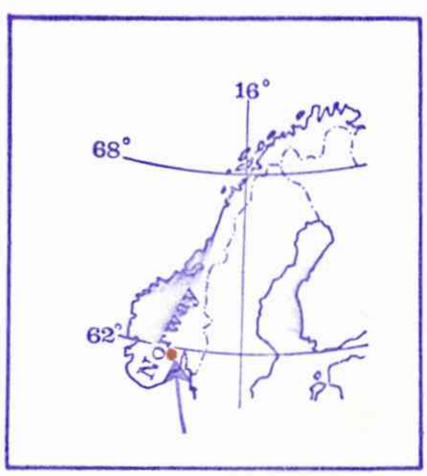
FOR FALCONBRIDGE NIKKELVERK A/S

A/S SULFIDMALM

PROJECT 905-14.

REPORT ON UNDERGROUND SAMPLING PROGRAMME AT THE SKUTTERUD MINES' MODUM, NORWAY. 1971.

G.K. KVAAL HYGEN



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INTRODUCTION

The old mines at Skuterud in Modum have been the subject of investigations by geologists since they ceased production in 1899. The investigations have been both from academic and economic view points. All the investigations of the economic possibilities have reached the conclusion that the mines give no encouragement for further development.

In 1952 Henry Brown undertook an investigation of the mines for Ventures Ltd. of Canada. Reinvestigation of his report on file in Toronto indicated relatively high results for copper and cobolt and particularly high results for molybdenum. The high content of molybdenum is remarkable since no earlier investigations have given any indications of economically interesting quantities of this element. Therefore a certain amount of sceptisism with respect to these results is justified. By a closer examination, however, they appear to have a rather regular distribution. The highest molybdenum values occur at the western ends of crosscuts, thus forming a continuous zone along the known strike of the rocks. A certain consistency of the results is apparent by comparing assay data from different crosscuts. Fig. 2 shows Brown's results, particularly from the Ludwig Eugen level. In crosscut D he chip-sampled the zone in 4 different sample widths. The highest values included was 0,37% molybdenum over 22,5 ft. However, the average over the complete crosscut is calculated as 0,1% molybdenum over 110 ft. If the results from this crosscut are then compared with crosscut A where he chip-sampled the whole crosscut into one sample, it is seen to be remarkably similar to the results obtained of 0,09% molybdenum over 93 ft.

Other assay results of Brown, shown on fig. 2, also indicate interesting assays in several places for cobolt and copper, such that a combination of the three elements, molybdenum, cobolt and copper, gave a reasonable opportunity of outlining economically interesting quantities of ore. It was therefore decided to sample the workings thoroughly and assay for these three elements, hoping that suitable combinations of them would give grounds for further developments.

SAMPLING

The sampling program was carried out by a diploma candidate from the Norwegian Technical University's Mining Department. Sampling assistants were recruited from the local area.

Channel samples were cut using a 1 kilo hammer, and hardened steel chisels. The sampling party consisted of two men, one who cut the channel and the other holding a plastic bucket to collect the broken rock. The sample was then placed in paper bags and immediately numbered. One sample usually required two bags. In particularly difficult areas the size of the sample was smaller. The weight of a two-bag sample is approximately 6 kgs. The length of the channels cut was kept at a standard length of 2 metres. In addition chip samples were collected over 4 and 5 metres lengths in certain areas to provide a check against the results of the channel sampling. The sampling procedure in this case also consisted of two men, one of whom chipped similar size fragments at intervals of 10-15 cms, with a maximum distance of 30 cm between chips. The chips were collected by the second man in a suitable container.

SAMPLE PREPARATION

The bags were taken to the Geological Museum in Oslo for further crushing prior to analysis.

All the samples were crushed in the same crusher, which was carefully cleaned with a steel brush and blown with compressed air between samples.

Since only 300-500 g were to be sent for analysis, the 6 kgs samples received had to be split. After crushing the received sample to a maximum size of 1 cm, the sample was split into two halves. One half was returned to Sulfidmalm's office for filing for future reference. The second half was further crushed and split until a finely ground sample of approx. 500 g remained to be forwarded to England for assay.

ASSAYS

The assays were carried out by Robertson Research Mineral Technology Ltd.'s Assay Labs at Ty'n-y-Coed, Llanrhos, in North Wales.

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The received sample was completely crushed in a Bico-Braun type UA pulverisor. All of the material from the pulverisor was crushed such that it would pass through a 60 mesh sieve. This material was split to one quarter or approximately 60 grams, which was further crushed by hand in an agate mortar until it would pass a hundred mesh sieve. The hundred mesh sample was then used for analysis.

Preliminary investigations of some of the samples showed that the molybdenum content was very low. Robertsoes therefore decided to use a spectrographic method for this element. A 20 miligram sample was taken and completely burnt in a 10 amp. current. The spectrum was then investigated in a Hilger and Watts large quartz spectrograph. The spectrum was compared with standard samples. The accuracy of this method in the interval 0.001% to 0,1% molybdenum is given as plus or minus 20%.

The copper and cobolt were assayed by atomic absorption. The assay sample was dissolved in a mixture of nitric acid and bromine. Perchloric acid was added and the solution warmed such that undesirable gasses were fumed off. The solution was then diluted to a standard volume in a volumetric flask.

Undissolved material was removed from the solution by help of settling. The solution was then measured for copper and cobalt on an EEL 240 atomic absorption spectrometer. The accuracy in the interval 0.005 to 0,05% is given as plus or minus 10%.

RESULTS

The assay results received from Robertson Research are shown in appendix 1. It is immediately apparent that these results are very much lower than those Brown obtained in 1952.

The molybdenum results are all so low as to be of absolutely no economic interest. The copper and cobolt results were further studied by assuming that one cobolt is aquivalent to five coppers, and thereby calculating how many samples contained 0,25% copper , equivalent. The following table shows those results which were high enough to give a copper equivalent of this value:

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TABLE I:

Samples returning assays ≥ 0,25% Cu equivalent

Level	Location	Sample No.	Cu %	Co %
Ludwig Eugen	Crosscut -2	01046	0,07	0,040
	" -5	01008	0,24	0,010
	" -8	01051	0,09	0,078
	" -8	03017	0,14	0,053
	" -8	02019	0,35	0,015
Clara (North)	Crosscut -2	01092	0,16	0,09
	" -5	03054	0,45	0,029
	Main drive	02038	0,14	0,030
	Crosscut -1	01102	0,34	0,030
	" -25	02063	0,13	0,066
Forhaabning		01110	0,67	0,008
		01112	0,05	0,054
Surface	Fortuna	04137	0,15	0,025
	E ofHenrietta	04145	0,13	0,037
	Main mine	04036	0,05	0,075
	" "	04038	0,11	0,040
	North mine	04193	0,16	0,95
	" "	04063	0,19	0,012
	Dumps at main mine	04004	0,32	0,08
	" "	04005	0,38	0,38
	" "	04006	0,15	0,62

There is no apparent correlation between the results from Ludwig Eugen level and the Clara level. A possibility of a correlation between the Clara level and the Forhaabnings level does exist. However, the assays and widths are of too small value to be of economic significance. The surface samples returning greater than 0,25% copper equivalent are too widespread and disconnected to be of potential economic significance.

CHECK ASSAYS

Because of the unexpectedly low results obtained for all three elements samples were sent again to Robertsons for reanalysis under different sample numbers, and samples were also sent to the Falconbridge Nikkelverk laboratory in Kristiansand. Some samples were also sent to Lakefield Research in Canada, which was the laboratory who had carried out the analyses for Mr. Brown.in 1952. The results of these check assays are shown in table 2, and indicate that the original results received from Robertsons are a true reflection of the levels present.

TABLE II:

CHECK ASSAYS

Sample No.	Robertson Research						Lakefield	Nikkelverket		
	Assay 1			Assay 2						
	%Cu	%Co	%Mo	%Cu	%Co	%Mo	%Mo	%Cu	%Co	%Mo
[illegible]010	0,08	0,014	<0,001	0,14	0,020	<0,001	0,0001	0,058	0,007	<0,005
01013	0,05	0,020	<0,001					0,066	0,013	<0,005
[illegible]010							0,0004			
01014	<0,01	<0,005	<0,001				0,0001	0,014	0,001	<0,005
[illegible]030	<0,01	<0,005	<0,001							
01029	0,01	<0,005	<0,001				0,0003			
[illegible]034	0,01	<0,005	<0,001				0,0001			
02011	0,02	0,006	<0,001					0,022	0,003	<0,005
0[illegible]010	0,08	0,014	<0,001	0,14	0,020	<0,001	0,0001	0,058	0,007	<0,005
0[illegible]009	0,06	0,022	<0,001	0,05	0,026	<0,001		0,059	0,016	<0,005
02012	0,01	0,005	<0,001	0,01	<0,005	<0,001	0,0002	0,016	0,002	<0,005
0[illegible]001	<0,01	<0,005	<0,001	<0,01	<0,005	<0,001	0,0002	0,012	0,001	<0,005
02002	<0,01	<0,005	<0,001	0,01	0,005	<0,001		0,016	0,004	<0,005
0[illegible]003	0,04	<0,005	<0,001	0,03	0,010	<0,001	0,0001	0,14	0,007	<0,005
02004	0,01	0,006	<0,001	0,02	<0,005	<0,001		0,034	0,002	<0,005
0[illegible]005	0,04	0,008	<0,001	0,04	0,005	<0,001	0,0003	0,034	0,003	<0,005
03011	0,03	0,008	<0,001					0,036	0,006	<0,005
0[illegible]010	<0,01	<0,005	<0,001				0,0001	0,015	0,002	<0,005
0[illegible]012	<0,01	<0,005	<0,001	0,03	<0,005	<0,001		0,020	0,003	<0,005
03004	<0,01	<0,005	<0,001	0,03	<0,005	<0,001	0,0002	0,010	0,001	<0,005
0[illegible]001	<0,01	<0,005	<0,001					0,089	0,001	<0,005
03005	0,01	0,006	<0,001	0,06	0,006	<0,001		0,020	0,004	<0,005

CONCLUSIONS

1) The results obtained by Brown in 1952 give a completely unrealistic picture of copper-cobalt-molybdenum mineralization at Modum.

2) Assaying and check assaying have indicated that molybdenum values in this area lie well below economically interesting amounts.

3) Scattered sampled indicated combined copper-cobalt contents, approaching economically interesting values. These points are so widespread, however, that there seems little chance of outlining the major tonnages that would be required at the low grade 66 0,25% copper equivalent.

4) No further work is justified on these deposits.

JCBGammer

LIST OF ENCLOSURES

APPENDIX 1

ASSAY RESULTS

Sample No.	Cu %	Co %	Mo %
14 00 064	<0.01	<0.005	<0.001
00 039	0.07	0.025	0.002
14 01 002	0.01	0.005	<0.001
003	0.07	0.011	0.001
004	0.05	0.007	<0.001
006	0.03	<0.005	<0.001
008	0.24	0.010	0.001
009	0.09	0.006	<0.001
011	0.06	0.012	<0.001
012	0.06	<0.005	<0.001
012A	0.02	0.005	<0.001
035	0.02	0.005	<0.001
045	0.08	0.020	<0.001
046	0.07	0.040	<0.001
047	0.06	0.023	<0.001
048	0.01	<0.005	<0.001
049	0.02	0.005	<0.001
050	<0.01	<0.005	<0.001
051	0.09	0.078	0.001
052	0.02	0.006	<0.001
053	0.03	0.008	<0.001
054	0.03	0.011	<0.001
056	0.08	0.025	<0.001
057	0.01	0.005	<0.001
058	<0.01	<0.005	<0.001
059	<0.01	<0.005	<0.001
060	0.09	0.055	0.003
061	0.07	0.024	<0.001
062	<0.01	<0.005	<0.001
062A	<0.01	<0.005	<0.001
063	<0.01	0.006	<0.001
065	<0.01	<0.005	<0.001
066	0.04	0.014	<0.001
067	0.03	0.007	<0.001
074	0.04	0.039	0.001
075	0.06	0.017	0.001
075A	0.06	0.11	0.001
090	0.11	0.025	0.003
091	0.11	0.007	0.003
092	0.16	0.090	<0.001
093	0.25	0.036	<0.001
093A	0.20	0.025	<0.001
095	0.05	0.016	0.001
096	0.06	0.016	0.002
097	0.15	0.006	0.001
098	0.09	0.015	<0.001
099	0.02	<0.005	<0.001
100	0.02	<0.005	<0.001
101	0.04	<0.005	<0.001
102	0.34	0.030	<0.001
103	0.10	0.017	<0.001
104	0.03	0.012	<0.001
105	0.10	0.013	<0.001
106	0.03	0.013	<0.001
107	0.03	<0.005	<0.001

Sample No.	Cu %	Co %	Mo %
14 01 108	0.08	0.015	0.006
109	0.05	0.007	0.001
110	0.67	0.008	0.002
112	0.05	0.054	0.001
115	0.05	0.016	<0.001
116	0.03	0.008	<0.001
14 02 013	0.05	0.009	0.002
014	0.06	0.011	0.003
015	0.07	<0.005	<0.001
016	0.06	0.005	<0.001
017	0.05	0.027	<0.001
018	0.04	0.015	0.007
019	0.35	0.015	<0.001
020	0.06	0.019	<0.001
021	0.06	0.008	<0.001
022	0.02	0.005	<0.001
023	0.04	0.006	<0.001
024	0.01	<0.005	<0.001
025	0.11	0.012	0.003
026	<0.01	<0.005	<0.001
027	0.03	0.011	<0.001
028	0.01	<0.005	<0.001
029	<0.01	<0.005	<0.001
030	<0.01	<0.005	<0.001
031	<0.01	<0.005	<0.001
032	0.02	<0.005	<0.001
033	0.01	0.002	<0.001
034	0.08	<0.005	<0.001
035	0.03	<0.005	<0.001
036	0.06	0.015	<0.001
037	0.08	0.015	<0.001
038	0.14	0.030	<0.001
042	0.03	0.006	0.001
043	0.07	0.009	<0.001
044	0.07	0.012	<0.001
046	0.02	<0.005	<0.001
048	0.01	0.009	<0.001
049	0.05	0.013	<0.001
050	0.10	0.007	0.002
051	0.11	0.013	0.001
052	0.03	0.006	<0.001
053	0.16	0.006	<0.001
054	0.10	0.031	<0.001
055	0.02	0.005	<0.001
057	0.14	0.014	0.001
058	0.14	0.020	<0.001
059	0.17	0.013	<0.001
060	0.07	0.010	<0.001
061	0.04	0.006	<0.001
062	0.04	0.006	<0.001
063A	0.06	0.060	<0.001
063B	0.13	0.066	<0.001
064	0.04	0.009	<0.001
065	0.03	0.014	<0.001
066	0.06	0.008	0.001
067	0.04	0.013	<0.001
068	0.03	0.015	<0.001

Cont.

Sample No.	Cu %	Co %	Mo %
14 02 068A	0.02	0.010	<0.001
069	0.04	0.012	<0.001
070	0.04	0.011	<0.001
071	0.06	0.011	<0.001
072	0.07	0.008	0.001
073	0.09	0.016	0.003
075	0.18	0.017	0.006
14 03 002	0.02	<0.005	<0.001
003	0.05	0.013	0.001
008	0.02	0.006	<0.001
009	0.08	0.018	<0.001
010	0.02	<0.005	<0.001
012	0.05	0.08	<0.001
013	0.02	0.006	0.001
014	0.08	<0.005	<0.001
016	0.08	<0.005	<0.001
017	0.14	0.053	<0.001
018	0.03	0.006	<0.001
019	0.01	0.011	<0.001
020	0.04	0.005	<0.001
021	0.01	<0.005	<0.001
022	0.04	0.009	<0.001
023	0.10	0.024	<0.001
024	<0.01	<0.005	<0.001
025	0.02	<0.005	<0.001
026	0.03	0.007	<0.001
027	<0.01	<0.005	<0.001
028	<0.01	<0.005	<0.001
029	0.01	0.007	<0.001
030	0.02	0.008	<0.001
031	0.03	<0.005	<0.001
032	<0.01	<0.005	<0.001
033	0.05	<0.005	<0.001
034	0.04	0.010	<0.001
035	0.08	0.015	<0.001
036	0.05	0.021	<0.001
037	0.10	0.017	<0.001
038	0.01	0.007	<0.001
040	0.03	0.009	0.003
041	0.02	0.023	<0.001
042	0.03	0.010	<0.001
043	0.02	0.009	<0.001
044	0.03	0.008	<0.001
045	0.01	0.009	<0.001
046	0.02	0.008	<0.001
047	0.03	0.005	<0.001
049	0.19	0.042	0.001
050	0.01	0.009	<0.001
051	0.02	<0.005	<0.001
052	0.06	0.048	0.007
053	0.06	0.009	0.001
054	0.45	0.029	<0.001
055	0.05	0.036	<0.001
056	0.10	<0.005	<0.001
057	0.02	0.006	<0.001

Cont.

Sample No.	Cu %	Co %	Mo %
14 03 058	0.02	<0.005	<0.001
059	0.06	0.009	0.002
060	0.05	<0.005	<0.001
061	0.01	0.008	0.005
062	0.02	0.025	<0.001
064	0.04	0.008	<0.001
14 04 059	0.07	0.008	0.003
060	0.03	<0.005	<0.001
061	0.03	0.013	<0.001
062	0.10	0.005	<0.001
063	0.19	0.012	<0.001
065	0.16	0.005	<0.001
066	0.03	<0.005	<0.001
067	0.02	<0.005	<0.001
068	<0.01	<0.005	<0.001
069	0.05	0.007	<0.001
070	0.17	0.008	0.001
072	0.07	0.006	<0.001
073	0.02	<0.005	<0.001
073A	<0.01	<0.005	<0.001
074	0.02	<0.005	<0.001
075	<0.01	<0.005	<0.001
076	0.03	<0.005	<0.001
077	<0.01	<0.005	<0.001
078	<0.01	<0.005	<0.001
079	<0.01	<0.005	0.010
080	<0.01	<0.005	<0.001
081	<0.01	<0.005	<0.001
082	0.09	<0.005	0.001
083	<0.01	<0.005	<0.001
084	<0.01	<0.005	<0.001
085	0.01	<0.005	<0.001
086	<0.01	<0.005	<0.001
087	0.01	0.005	<0.001
088	<0.01	<0.005	<0.001
089	<0.01	<0.005	<0.001
090	<0.01	<0.009	<0.001
091	0.02	0.009	<0.001
092	0.02	0.009	<0.001
093	<0.01	0.014	<0.001
094	0.03	0.028	<0.001
095	0.01	<0.005	<0.001
096	<0.01	<0.005	<0.001
097	0.01	<0.005	<0.001
098	<0.01	<0.005	<0.001
099	<0.01	<0.005	<0.001
100	<0.01	<0.005	<0.001
101	0.02	0.025	<0.001
102	0.01	0.008	<0.001
104	0.02	<0.005	<0.001
105	0.04	<0.005	<0.001
106	<0.01	0.008	<0.001
107	<0.01	0.005	<0.001
109	<0.01	<0.005	<0.001
110	0.01	0.007	<0.001
112	0.02	<0.005	<0.001

Sample No.	Cu %	Co %	Mo %
14 04 113	0.05	0.038	<0.001
114	0.08	0.022	0.001
115	<0.01	<0.005	<0.001
116	<0.01	<0.005	<0.001
117	<0.01	<0.005	<0.001
118	<0.01	<0.005	<0.001
119	<0.01	<0.005	<0.001
120	0.04	0.008	<0.001
121	<0.01	<0.005	<0.001
123	0.03	<0.005	<0.001
124	0.10	0.014	<0.001
125	0.04	0.021	<0.001
126	0.04	0.010	<0.001
127	0.01	0.008	<0.001
128	0.06	0.015	<0.001
128A	0.03	0.032	<0.001
129	0.03	0.013	<0.001
130	0.06	0.014	<0.001
131	0.04	0.011	<0.001
132	0.07	0.008	<0.001
134	0.02	<0.005	<0.001
135	0.03	0.005	<0.001
136	0.02	<0.005	<0.001
137	0.15	0.025	<0.001
138	0.01	0.012	<0.001
139	0.10	0.017	0.001
140	0.06	0.010	0.002
141	0.01	0.011	<0.001
142	0.01	<0.005	<0.001
143	0.01	0.006	<0.001
144	0.01	0.031	<0.001
145	0.13	0.037	0.001
146	0.09	0.030	0.001
147	0.06	0.026	0.001
148	0.01	0.013	<0.001
149	0.01	0.005	0.001
150	0.07	0.011	<0.001
151	0.04	0.012	<0.001
152	0.08	0.006	<0.001
153	0.10	0.018	0.001
154	0.07	0.010	<0.001
155	0.03	0.005	0.001
156	0.08	0.014	<0.001
157	0.02	0.011	<0.001
158	0.02	0.016	0.003
159	0.02	<0.005	<0.001
160	0.01	<0.005	<0.001
161	0.01	<0.005	<0.001
162	<0.01	<0.005	<0.001
163	0.01	0.006	<0.001
164	0.01	<0.005	<0.001
165	<0.01	0.009	<0.001
166	0.01	0.010	<0.001
167	0.02	0.011	<0.001
168	<0.01	0.010	<0.001
169	<0.01	<0.005	<0.001
170	<0.01	0.005	<0.001

	Sample No.	Cu %	Co %	Mo %
	14 04 171	0.03	0.007	<0.001
	172	<0.01	<0.005	<0.001
	173	<0.01	<0.005	<0.001
	174	<0.01	0.006	<0.001
	175	<0.01	<0.005	<0.001
	176	<0.01	<0.005	<0.001
	177	0.01	0.011	<0.005
	179	0.01	0.006	<0.001
	180	<0.01	<0.005	<0.001
	181	0.01	0.007	<0.001
	182	0.04	0.010	0.001
	185	0.07	<0.005	0.002
	186	0.05	<0.005	<0.001
	187	0.12	0.012	0.003
	190	0.03	0.006	<0.001
	191	0.02	0.009	<0.001
	192	0.11	0.006	<0.001
	193	0.16	0.95	<0.001
	194	0.05	0.017	<0.001
	14 05002	0.03	0.009	<0.001
	014	0.06	0.012	<0.001
	015A	0.07	0.018	<0.001
	015B	0.07	0.019	<0.001
	018	0.01	0.009	<0.001
	019	0.02	<0.005	<0.001
	020	<0.01	<0.005	<0.001
	021	0.02	0.009	<0.001
	022	0.02	0.006	<0.001
	023	0.02	<0.005	0.002
	024	<0.01	<0.005	<0.001
	025	0.01	0.005	<0.001
	026	<0.01	<0.005	<0.001
	027	0.02	<0.005	<0.001
	028	0.01	<0.005	<0.001
	029	0.01	<0.005	<0.001
	030	0.13	0.011	0.002
	032	<0.01	<0.005	<0.001
Svartfjell	033	<0.01	<0.005	<0.001
	034	0.04	0.007	<0.001
	035	<0.01	<0.005	<0.001
	14 06 001	0.05	0.026	<0.001
	002	0.14	0.020	<0.001
	003	0.03	<0.005	<0.001
	004	0.01	<0.005	<0.001
	005	0.03	<0.005	<0.001
	006	<0.01	<0.005	<0.001
	007	0.01	0.005	<0.001
	008	0.03	0.010	<0.001
	009	0.06	0.006	<0.001
	010	0.02	<0.005	<0.001
	011	0.04	0.005	<0.001

Sample Ref. No.	Cu %	Co %	Mo %
Proöi I 8/771	<0.01	<0.005	<0.001
1401 005 71	0.03	0.014	<0.001
1401 007 71	<0.01	<0.005	<0.001
1401 013 71	~~<0.05~~ 0.05	0.020	<0.001
1401 014 71	<0.01	<0.005	<0.001
1401 015 71A	<0.01	<0.005	<0.001
1401 015 71B	<0.01	<0.005	<0.001
1401 016 71	<0.01	<0.005	<0.001
1401 019 71	<0.01	<0.005	<0.001
1401 020 71	0.02	0.013	<0.001
1401 021 71	<0.01	<0.005	<0.001
1401 022 71	<0.01	<0.005	<0.001
1401 023 71	<0.01	<0.005	<0.001
1401 024 71	0.03	0.006	<0.001
1401 025 71	<0.01	<0.005	<0.001
1401 026 71	<0.01	<0.005	<0.001
1401 027 71	<0.01	<0.005	<0.001
1401 028 71	<0.01	<0.005	<0.001
1401 029 71	0.01	<0.005	<0.001
1401 030 71	<0.01	<0.005	<0.001
1401 031 71	<0.01	<0.005	0.001
1401 032 71	<0.01	<0.005	<0.001
1401 033 71	<0.01	<0.005	<0.001
1401 034 71	0.01	<0.005	<0.001
1401 035 71	<0.01	<0.005	<0.001
1401 036 71	<0.01	<0.005	<0.001
1401 037 71	<0.01	<0.005	<0.001
1401 038 71	<0.01	<0.005	<0.001
1401 039 71	<0.01	<0.005	<0.001
1401 040 71	<0.01	<0.005	<0.001
1401 041 71	<0.01	<0.005	<0.001
1401 042 71	<0.01	<0.005	<0.001
1401 043 71	<0.01	<0.005	0.001
1401 044 71	<0.01	<0.005	<0.001
✓1402 001 71	<0.01	<0.005	<0.001
1402 002 71	<0.01	<0.005	<0.001
1402 003 71	0.04	<0.005	<0.001
1402 004 71	0.01	0.006	<0.001
1402 005 71	0.04	0.008	<0.001
1402 006 71A	0.10	0.028	<0.001
1402 006 71B	0.05	0.010	0.002
1402 007 71	0.03	0.006	0.001
1402 008 71	0.02	0.007	<0.001
1402 009 71	0.06	0.022	<0.001
1402 010 71	0.08	0.014	<0.001
1402 011 71	0.02	0.006	<0.001
1402 012 71	0.01	0.005	<0.001
1402 017 71	<0.01	<0.005	<0.001
✓1403 001 71	<0.01	<0.005	<0.001
1403 004 71	<0.01	<0.005	<0.001
1403 005 71	0.01	0.006	<0.001
1403 007 71	0.03	0.008	<0.001
1403 010 71	<0.01	<0.005	<0.001
1403 011 71	0.03	0.008	<0.001
1403 012 71	<0.01	<0.005	<0.001

Sample Ref. No.	Cu %	Co %	Mo %
1404 003 71	0.08	<0.005	<0.001
1404 004 71	0.32	0.080	<0.001
1404 005 71	0.38	0.380	<0.001
1404 006 71	0.15	0.062	<0.001
1404 007 71A	0.04	0.005	<0.001
1404 007 71B	0.07	0.020	<0.001
1404 009 71	0.08	0.026	<0.001
1404 010 71	0.10	<0.005	<0.001
1404 012 71	0.03	<0.005	<0.001
1404 013 71	<0.01	<0.005	<0.001
1404 014 71	<0.01	<0.005	<0.001
1404 015 71	0.08	<0.005	<0.001
1404 016 71	0.03	<0.005	<0.001
1404 017 71	0.0[illegible]	0.005	<0.001
1404 018 71	<0.01	<0.005	<0.001
1404 019 71A	<0.01	<0.005	<0.001
1404 019 71B	0.02	<0.005	<0.001
1404 020 71	<0.01	0.014	<0.001
1404 021 71A	<0.01	<0.005	<0.001
1404 021 71B	<0.01	<0.005	<0.001
1404 023 71	<0.01	<0.005	<0.001
1404 024 71	<0.01	<0.005	<0.001
1404 025 71	<0.01	<0.005	<0.001
1404 026 71	<0.01	<0.005	<0.001
1404 027 71	<0.01	<0.005	<0.001
1404 028 71	<0.01	<0.005	<0.001
1404 029 71	0.02	<0.005	<0.001
1404 030 71	0.11	<0.005	<0.001
1404 031 71	<0.01	0.110	<0.001
1404 032 71	<0.01	<0.005	<0.001
1404 033 71	0.02	<0.005	<0.001
1404 034 71	0.11	0.005	<0.001
1404 035 71	0.04	0.007	<0.001
1404 036 71	0.05	<0.005	<0.001
1404 037 71	0.05	0.075	<0.001
1404 038 71	0.11	0.007	<0.001
1404 039 71	0.12	0.040	<0.001
1404 040 71	0.04	0.009	<0.001
1404 041 71	<0.01	0.011	<0.001
1404 042 71A	0.06	<0.005	<0.001
1404 042 71B	<0.01	<0.005	<0.001
1404 043 71	0.02	<0.005	<0.001
1404 044 71	<0.01	0.007	<0.001
1404 045 71	<0.01	0.005	<0.001
1404 046 71	0.06	<0.005	<0.001
1404 047 71	<0.01	0.005	<0.001
1404 048 71	0.02	0.005	<0.001
1404 049 71	<0.01	0.005	<0.001
1404 050 71	<0.01	<0.005	<0.001
1404 051 71	<0.01	<0.005	<0.001
1404 052 71	<0.01	<0.005	<0.001
1404 (053/052) 71	0.02	<0.005	<0.001
1404,054 71	0.06	<0.005	<0.001
1404 055 71	<0.01	<0.005	<0.001
1404 056 71	0.13	<0.005	<0.001
1404 057 71	0.01	0.006	<0.001
1404 058 71	0.01	<0.005	<0.001
1404 077 71	0.02	<0.005	<0.001
14 0 0 71	0.02	0.012	<0.001

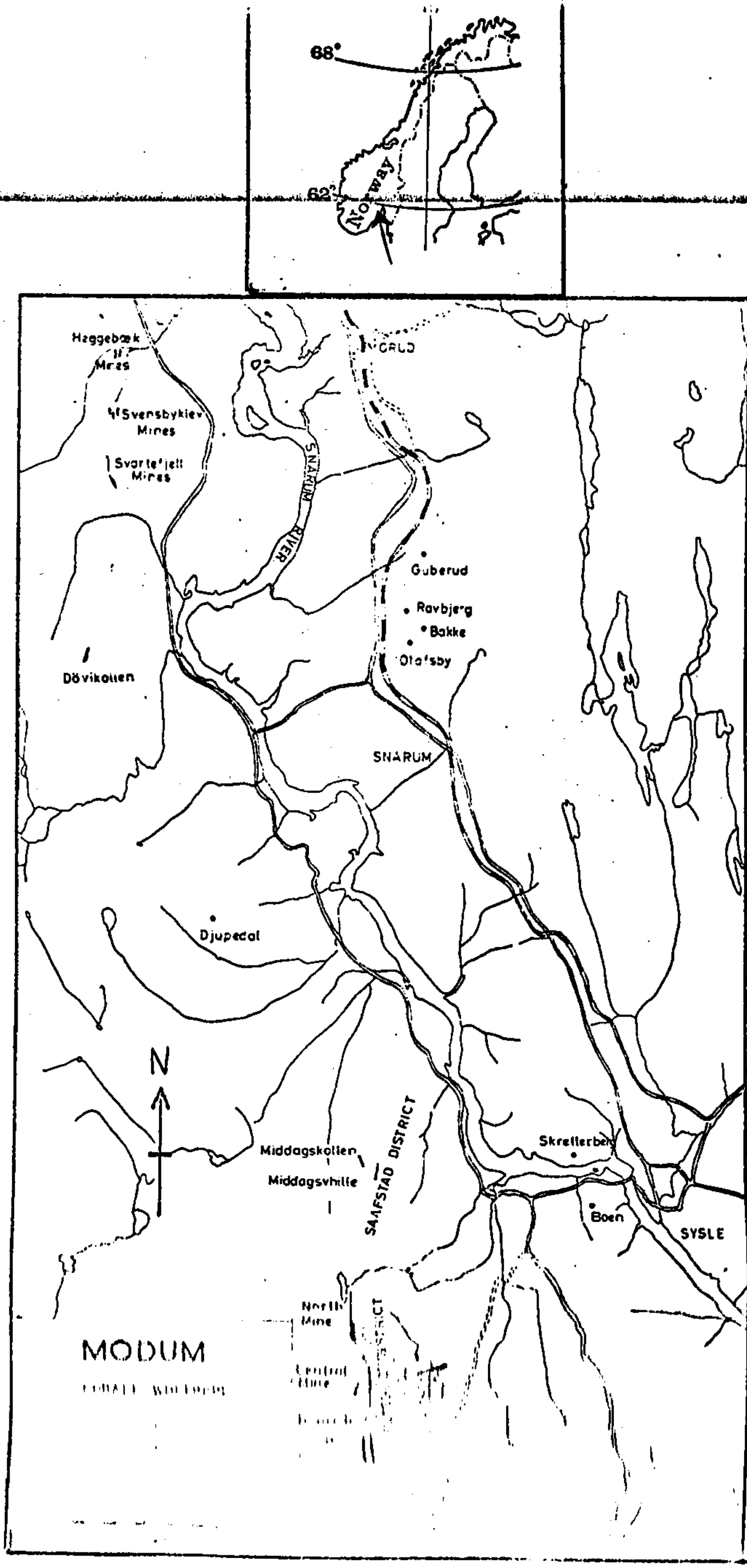


FIG. 1.

Vikersund sentrum, 6 km.

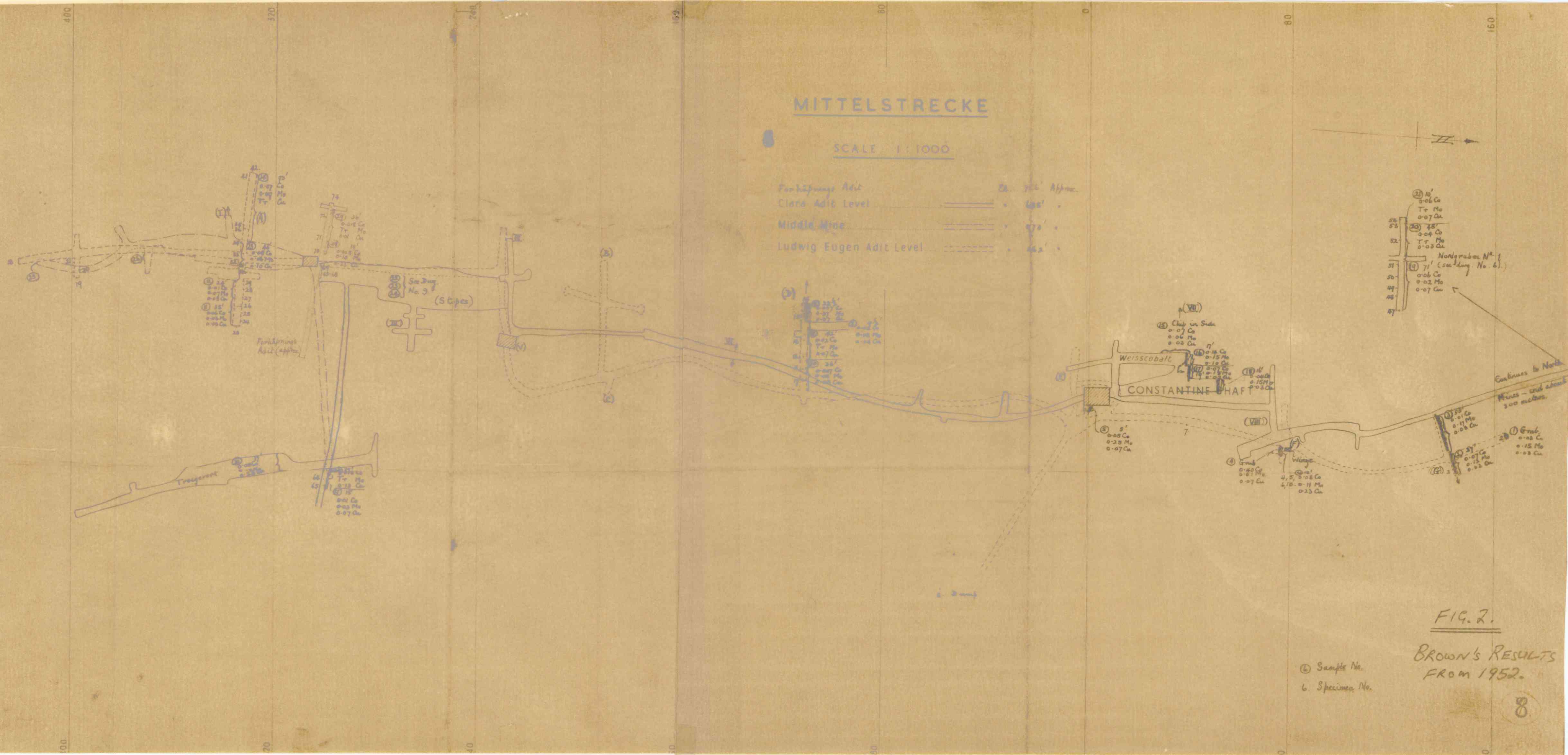


FIG. 2.

BROWN'S RESULTS FROM 1952.

LEGEND

× Sample point

(Nb: All surface samples have prefix 4)

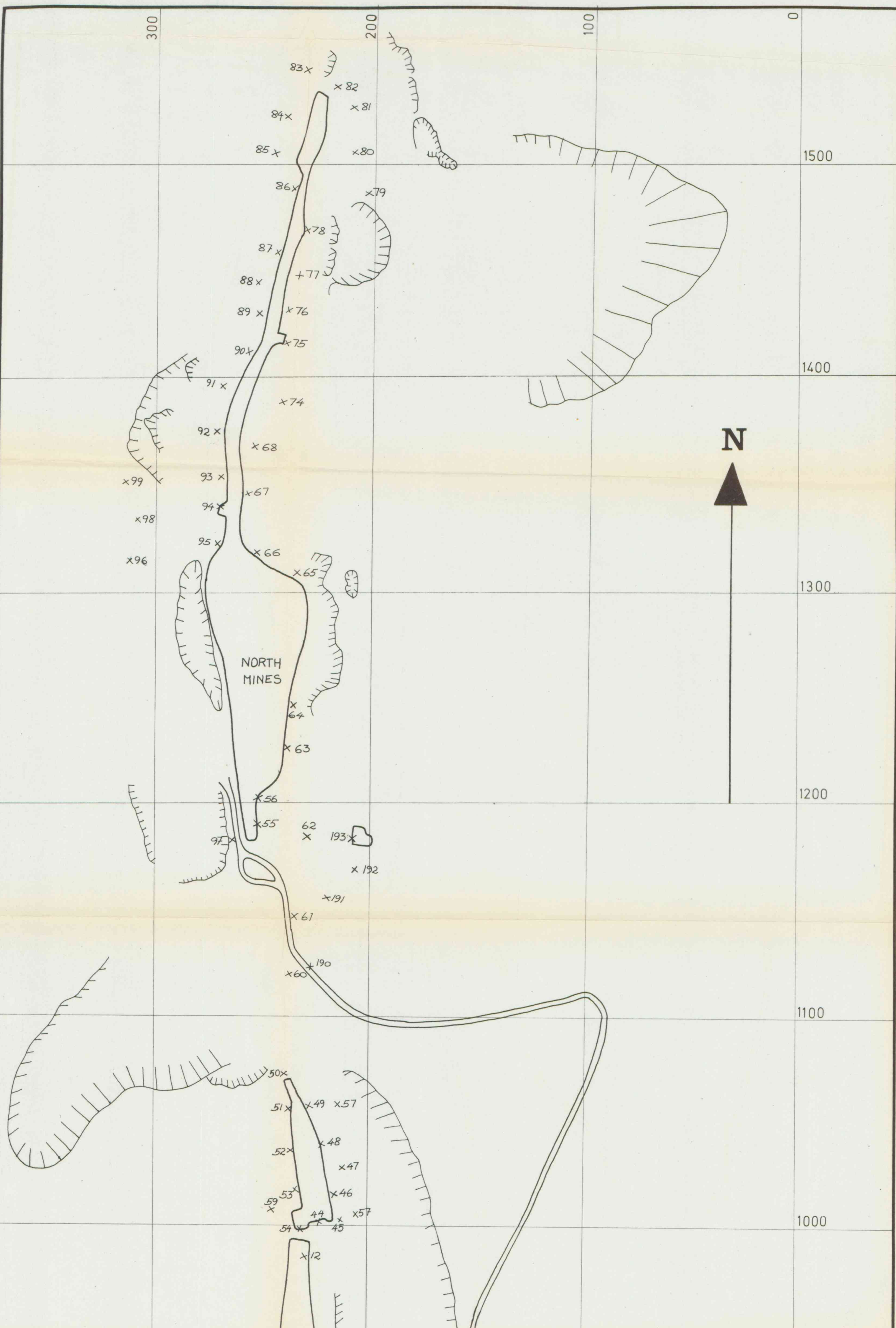
SURFACE SAMPLES
SKUTTERUD MINES
MODUM SOUTHERN AREA

SCALE	OBS.	
1:1000	DRAW. D.B.G.	
	TRAC. U.T.	11.71
	CHK.	

A/S SULFIDMALM

MAP NO: 905-14-1

MAP SHEET

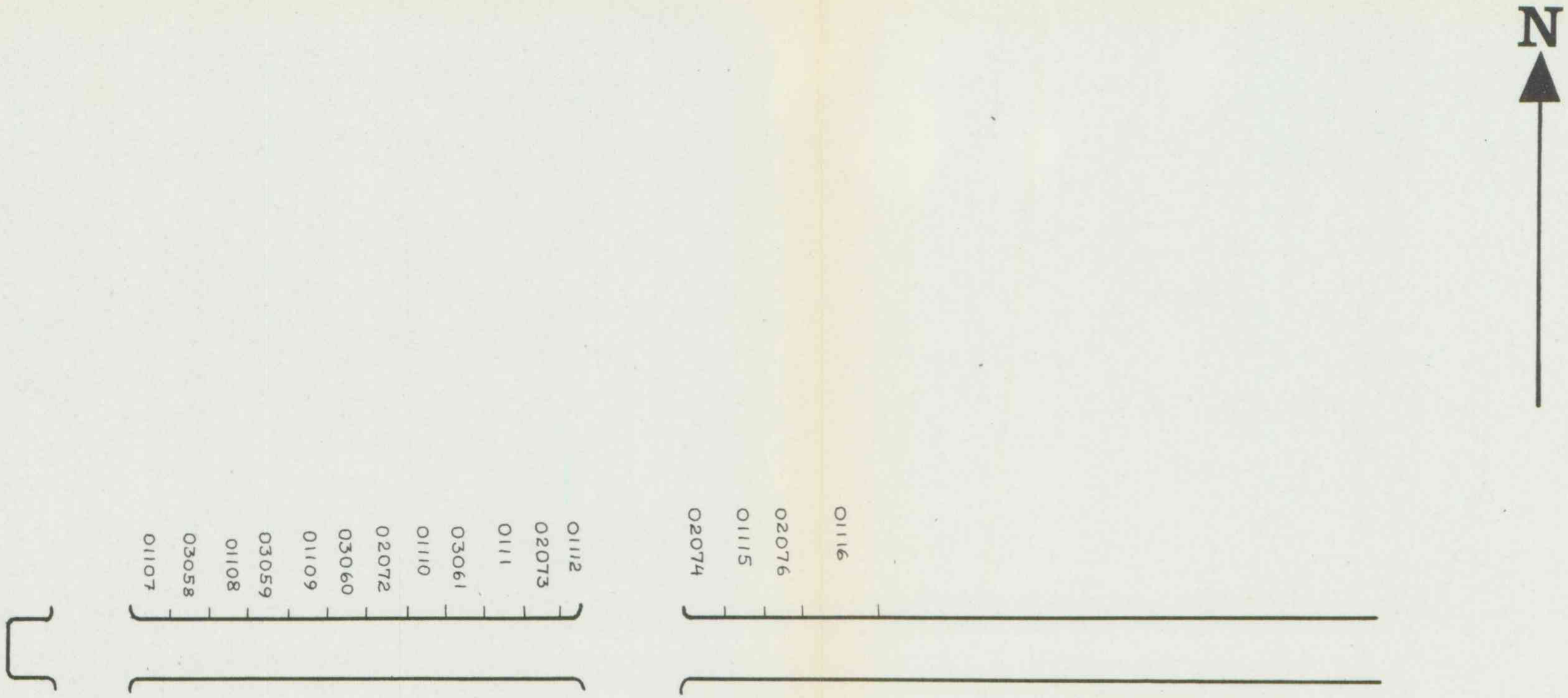


LEGEND

× Sample point

(NB: All surface samples have prefix 4)

SURFACE SAMPLES SKUTERUD MINES MODUM NORTHERN AREA	SCALE 1:1000	OBS. DRAW. J.B.G. TRAC. U.T. 11.71 CHK
A/S SULFIDMALM	MAP NO: 905-14-2 MAP SHEET:	



FORHAABNING LEVEL
SKUTERUD MINES MODUM
SAMPLE LOCATIONS

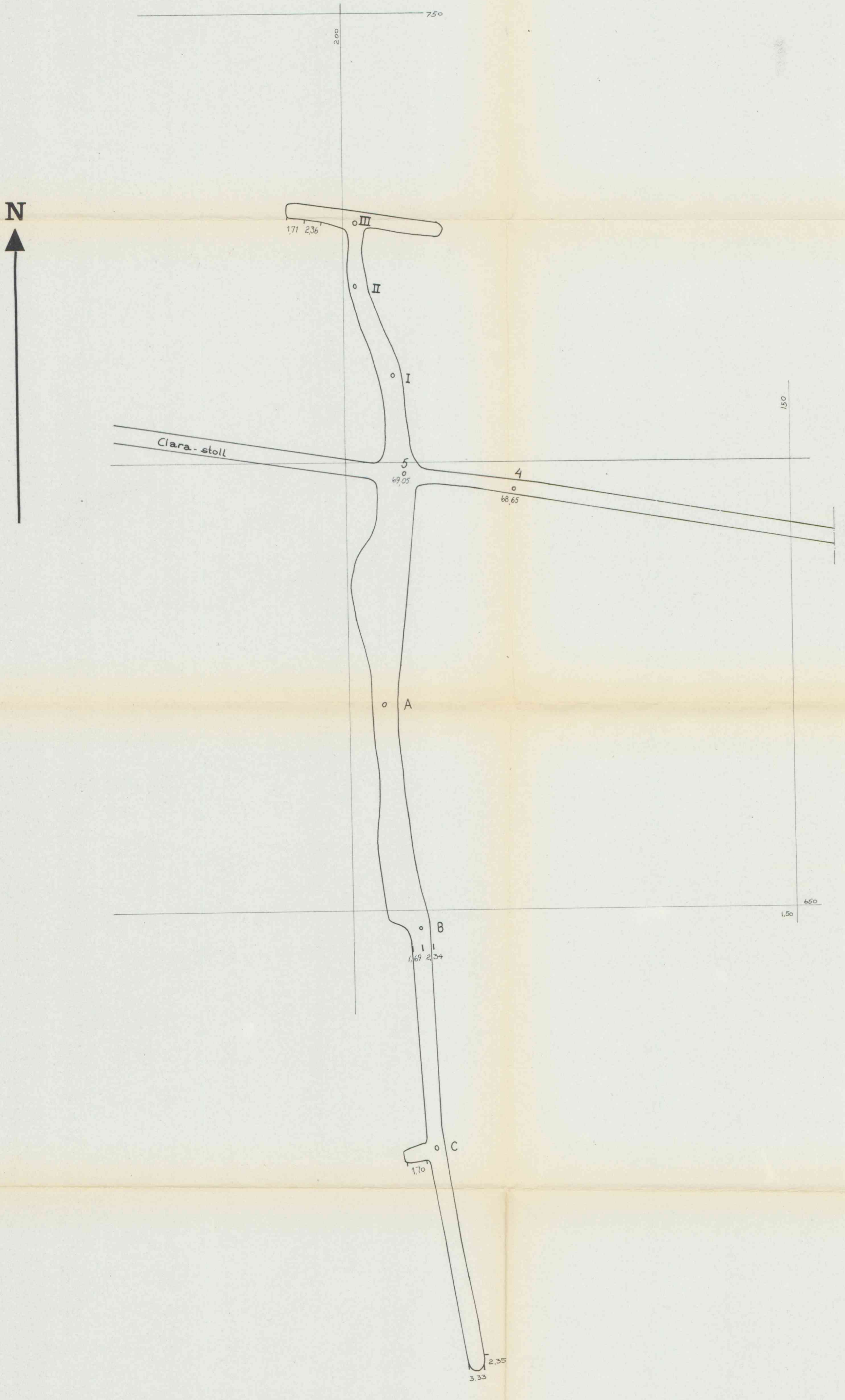
SCALE		
1: 250	OBS.	
	DRAW. GKKH	
	TRAC. U.T.	1.72
	CHK.	

A/S **SULFIDMALM**

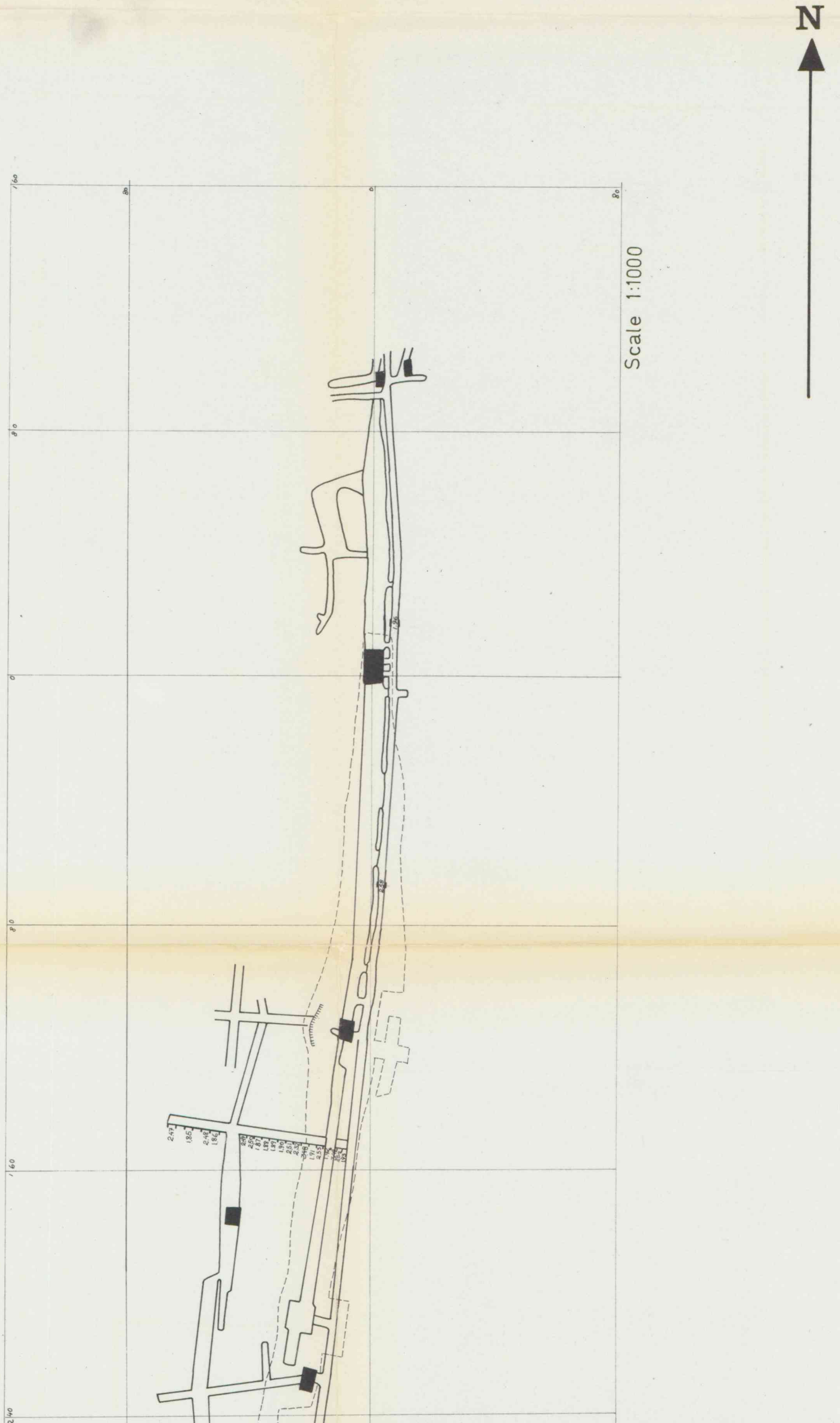
MAP NO.
905-14-3

MAP SHEET

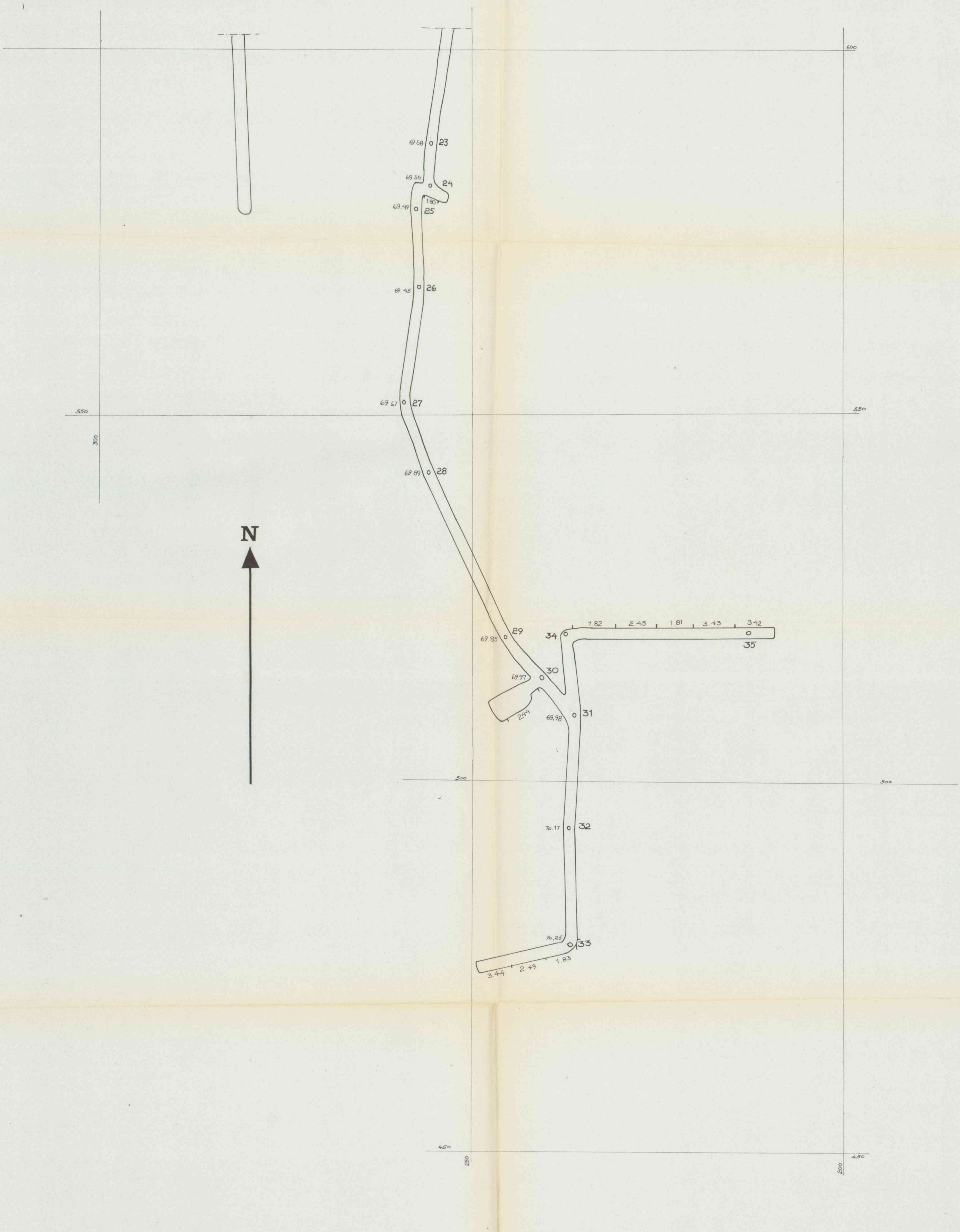
A.s Tørrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.



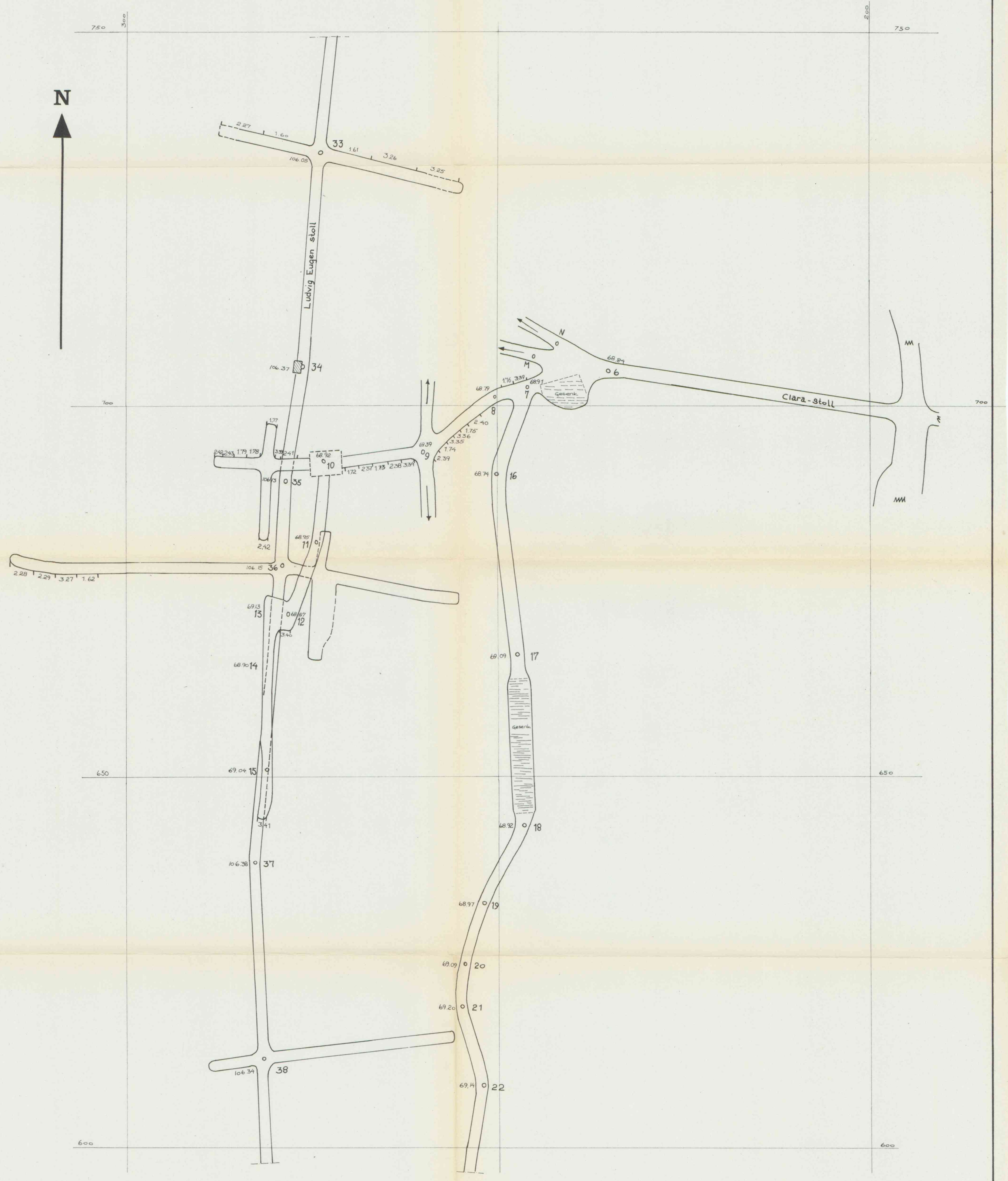
CLARA LEVEL (central area) SKUTERUD MINES, MODUM SAMPLE LOCALITIES	SCALE 1:250	OBS. DRAW. TRAC. 11.71 CHK.	
A/S **SULFIDMALM**	MAP NO. 905-14-4 MAP SHEET.		



CLARA LEVEL (northern section) SKUTERUD MINES, MODUM	SCALE 1:1000	OBS. DRAW. GKvH TRAC. U.T 11.71 CHK.
A/S SULFIDMALM	MAP NO. 905-14-5	
	MAP SHEET.	

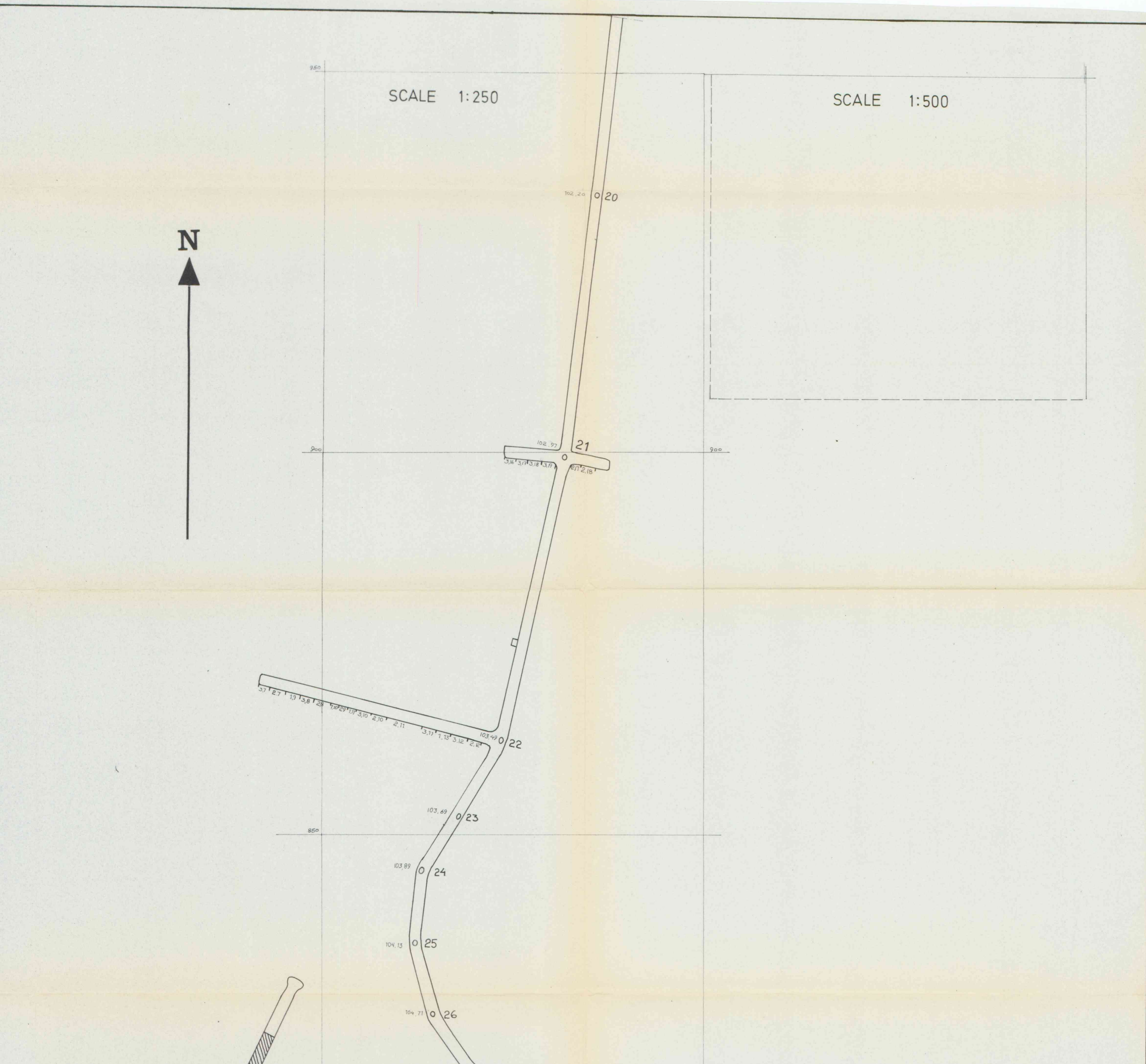


CLARA LEVEL (southern section) SKUTERUD MINES, MODUM SAMPLE LOCATION	SCALE 1:250	OBS. DRAW. J.B.G. TRAC. U.T. CHK.	 11.72
A/S SULFIDMALM	MAP NO. 905-14 - 6		
	MAP SHEET.		



CLARA AND LUDWIG EUGER LEVEL (west-central section) SKUTERUD MINES, MODUM SAMPLE LOCATION	SCALE 1:250	OBS.	
		DRAW. J.B.G.	
		TRAC. U.T.	11.71
		CHK.	
A/S SULFIDMALM	MAP NO. 905-14-7		
	MAP SHEET.		

LUDWIG EUGEN LEVEL (cross cut and drive north) SKUTERUD MINE, MODUM SAMPLE LOCALITIES	SCALE 1:250 1:500	OBS. DRAW. J.B.G. TRAC. U.T. CHK.	 11.71
A/S **SULFIDMALM**	MAP NO: 905-14-8 MAP SHEET:		



LUDWIG EUGEN LEVEL
(south drive)
SKUTERUD MINES MODUM

SCALE		
1:250 1:500	OBS.	
	DRAW. J.B.G.	
	TRAC. UT	11.71.
	CHK.	

A/S SULFIDMALM

MAP NO. 905-14-9

MAP SHEET.